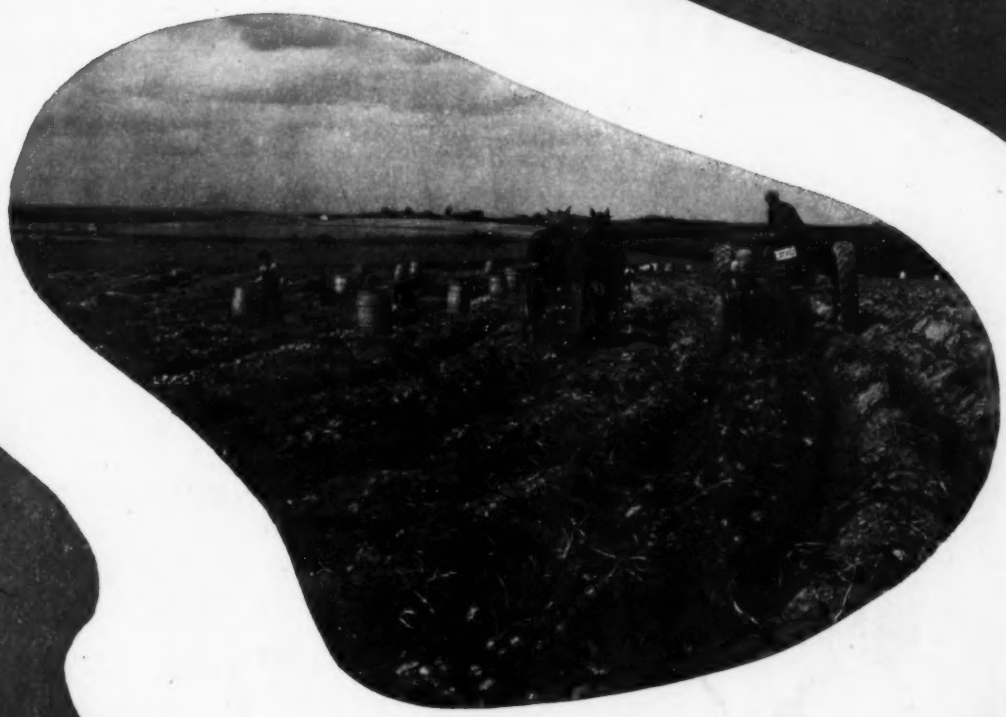

October 1943

SOIL CONSERVATION

OFFICIAL ORGAN OF THE SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C.

Contents

Front Cover
Scene: Harvesting potatoes grown on contour, Limestone, Maine.
Photographer: George C. Lowary.

WELLINGTON BRINK
EDITOR

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SOIL CONSERVATION

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SECRETARY OF AGRICULTURE

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CHIEF, SOIL CONSERVATION SERVICE

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SURVEY TELLS CONSERVATION NEEDS OF NATION

BY THE EDITOR

For the first time in history a practical "job sheet" is available to American farmers. It outlines, area by area—and eventually will outline farm by farm—the soil conservation practices that must be put on the land to assure maximum farm production at minimum soil loss. It is the result of a year's survey by several hundred trained technicians of the Soil Conservation Service, a survey which Chief H. H. Bennett says is fast nearing completion.

Almost half a billion acres in the United States are suited to crop production, after the exclusion of some 40 million acres of cropland that should be permanently retired. This great bulk calls for extensive and intensive soil conservation measures. It includes potential dust bowls, vast flood inducing watersheds, great expanses of thirsty soils that require water-saving measures, and wet soils that must be drained. The survey spotlights a sleeping farm giant that is only partly functioning, that is misapplying much of its energy, that is idling to a surprising degree, that lacks the full armor to defend itself against bristling attacks of wind and rain.

What are the immediate—and the ultimate—needs of this land we defend? The answer lies in this tabulation of figures that have been rolling in through many months—from New England and the deep South, from the cut-over areas of Wisconsin and the plains of Texas, from the wheat fields of Washington and the citrus groves of California. Farm by farm, county by county, state by state, comes the blueprint of a rural America that can be made fully productive and soil-secure by the science of soil conservation.

More than 95 million acres, for example, call for terracing. Nearly 122 million acres demand contour planting. The wide ribboning known as strip cropping belongs on upward of 90 million acres. Cover crops should be laid across 33 million acres. Irrigation water should be led down the furrows of nearly 11 million acres.

Here's a relatively Lilliputian item: pond management should be invoked on 720 thousand acres. And here's one of Brobdingnagian dimensions: 400 and more million acres of grassland desperately need proper stocking.

Out of 59 standard soil conservation practices, 23 were selected as being of prime importance. Each of these 23 major practices directly increases crop production and is urgently needed now as a war measure.

Cutting the whole new pattern indicated by the Soil Conservation Service survey will entail a staggering outlay of money, technical personnel, labor, machinery, fertilizers, and seed, it is freely admitted by Dr. Bennett. It will take years to do the entire job, he says—but even the begin-

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nings already made have paid rich and immediate dividends. Major war crops have already responded with 20 percent increased yields, where soil conservation measures have been applied.

In 1942, for example, soil conservation practices put on 10 million acres accounted for an increase of nearly 34 million pounds of peanuts and more than 37 million pounds of beef or beef equivalent. Eleven other major war commodities paid comparable dividends from soil conservation: wheat, soybeans, corn, hay, cotton, flaxseed, dry beans, cottonseed, potatoes, grain sorghums, field peas.

With the hungry millions of the world waiting to be fed and clothed, with millions of fighting men to be amply supplied on every front, soil conservation practices have been spread in 1943 over 27,000,000 acres. On the basis of experience, the Soil Conservation Service is able to predict startling increases in this year's crops because of these practices—boosts in yield aggregating 22,664,000 bushels of wheat, 1,580,000 bushels of soybeans, 17,889,000 bushels of corn, 4,013,000 bushels of potatoes, 91,142,000 pounds of peanuts, 100,941,000 pounds of beef, and similarly impressive gains in other commodities.

Records of the Soil Conservation Service indicate that when the new farming methods are properly applied to an average acre of corn land, a 7-bushel increase in yield can be anticipated. That's the immediate dividend—it follows right along the very first year.

If every pasture now grazed by Queen Cow were to be properly assigned, planted to the right grasses and legumes, worked into a rotation chart, given what lime and fertilizers it requires, it is highly doubtful if the rationing of butter, cheese, and other dairy products would ever be necessary. No less than 240 pounds of milk would be added to the yield of each milk-producing acre in the land by invoking an intelligent soil-conservation program.

The agency's studies show that crop yields everywhere respond promptly to a soil-conservation system, whether beef, oats, hay, cotton, flaxseed, soybeans, or other commodities are involved.

The new survey charting actual conservation needs for the United States is based on strict adherence to land capabilities. This yardstick "land capabilities," including the term itself, is of relatively recent origin. It constitutes a departure from the former conception of what a farmer needs to know about his land. The Service, through its land-capability maps, now provides a farmer with utilitarian classifications of his land according to a framework of physical factors. Uses of land—now indicated by a series of eight numbers, and as many colors—are determined by soil, slope, erosion, and climate. Uses are of four main categories—crops, grass, woods, and miscellaneous.

The new conservation-needs survey is a translation and a summary of what it will take to convert every bit of land to its safest, most profitable, and most efficient form of production. In assigning roles, the survey places continuing productiveness second only to immediate productiveness for war purposes.

In November Thomas A. Hester tells the story of a man's faith, hopes, and plans—how Señor Antonio Matos transformed his Puerto Rican farm from a loser to a winner. "It is pleasant to hear the jingle of coins from the sale of the vegetables," says Señor Matos.

BY ROBERT E. ADCOCK

In the picture above, we see at the left Jader T. Rezende, fiber crop specialist of the Brazilian Ministry of Agriculture, Rio de Janeiro; right, Clark Hardenson, rancher 7 miles northeast of Beeville, Tex. On Hardenson's 4,000-acre ranch de Rezende learned how Rhodes grass is controlling soil erosion and increasing beef production.

A YOUNG EXPERIMENT station superintendent in the State of Pernambuco, Brazil, received an air mail letter from his chief. Would he be interested in a scholarship to study soil conservation with the Soil Conservation Service of the United States?

Sure, he wanted to go. He had read about the Soil Conservation Service, and he had observed the need for conservation measures on the lands of Brazil. He also had a burning desire to know first hand of the U. S. A.

More than six months ago he left his home country. What has he done? What has happened to him?

To start with, he went by airplane from Rio to Miami, thence by train to Washington. In 14 days at Washington he met Dr. H. H. Bennett and other officials of the Department of Agriculture, and studied English. He learned the names of foods, wearing apparel, and other essentials. English was a peculiar language, he thought. To save his soul, he could not flip a T from the back of his front teeth, or roll an R quite round. While he has not yet learned to touch a T just right or round out an R to perfection, his English has improved and he has developed many new abilities in the art of soil conservation.

From Washington he journeyed next to Fort Worth. In the office of the Soil Conservation Service there he learned about regional organization and the functions of the technical and administrative divisions. He acquired an over-all picture of the operation of soil conservation districts. Conservation moved slowly. He explained to staff men some of his country's conservation problems. A photographer took a picture of him with the regional conservator. A report of the trainee's work was published in a Fort Worth newspaper. He began to realize that his study meant more than just his own professional improvement. He began to feel his responsibility for carrying back to his country not only technical knowledge and skills, but also knowledge of the social and economic conditions that permitted such a great movement as soil-conservation districts to develop as it has here in the United States.

From Fort Worth, the regional training officer took him to a very small town in south Texas. His first reaction was, "What can this town have?" It was so small and so different from the large towns he had visited. The office was over the bank—a not very good office. The training officer, the work-unit leader, and the trainee sat down at a long table. They talked together about the trainee's trip, his native home, and the contrasts between countries. Soon the conversation turned to business. It was very difficult for him to follow. He could tell, however, that it

EDITOR'S NOTE.—The author is Regional Training Officer, Soil Conservation Service, Fort Worth, Tex.

was about his future in the work unit. The other men were reviewing the regional Latin-American training program, and discussing ways and means of applying it. He received a copy of the program. Major points were summarized on the front page about as follows:

I. Over-all objective—To develop in Latin American trainee the abilities necessary to carry out a complete and coordinated program of soil and water conservation; and to provide him with the experiences that will aid him in the pursuit of a satisfying life.

II. Probable time to be spent in the work unit—6 months.

III. Problems in which training will be provided.

- A. Acquainting the trainee with the country, the work unit area, and the office surroundings.
- B. Acquainting the trainee with the functions of other agricultural agencies—especially those related to soil conservation districts.
- C. Acquainting the trainee with Service objectives and organizations.
- D. Acquainting the trainee with the organization and operations of a soil conservation district.
- E. Developing the ability to make a conservation survey.
- F. Developing the ability to use land capability tables.
- G. Developing the ability to assist a farmer make a farm conservation plan.
- H. Developing the ability to assist farmers in establishing and maintaining the major conservation practices used in the district.

The man with the uplifted arm is Paulo P. P. de Melo, professor and director of Instituto de Pesquizas Agronomicas, Recife, Pernambuco, Brazil. The man with the big smile, in the center, is Jader T. de Rezende, inspector, Section of Textile Plants, Brazilian Ministry of Agriculture, Rio de Janeiro. The man at the right is J. M. Ruhman, owner of the farm; he is watching while de Melo and de Rezende check a terrace he built as part of the soil and water conservation system he is establishing with help from the Karnes County Soil Conservation District and the Soil Conservation Service.

He left this work unit recently. Here are some of the things he did before leaving.

Six weeks were spent with a soils surveyor. The first day, he relates, they mapped 500 acres, the second day 1,000 acres, and the third day 1,500. They dealt with slopes, soils, degrees of erosion—all correlated to land capability. ("I think every agriculturist needs to *do* before he can *do much good*," the trainee remarked.)

Our Latin American friend studied at night, and he studied in the field all day. After six weeks of this, the soils surveyor gave him two aerial photos covering about four square miles and asked him to make the conservation survey by himself. He mapped these four square miles and the surveyor said that but for minor differences they were as he would have done the job himself. The trainee plans to take copies of the two back to Brazil with him, as a pattern to use in his work.

His experience in farm planning and practice-establishment were intermingled over the remainder of his stay at the work unit. He accompanied the work unit leader on the planning of 10 new farms and in making adjustments in the plans of 20 farms. He actually started and completed four farm plans under the guidance of the farm planner. He learned to plan and establish a complete terrace system, including individual outlets and designed channels. He considered himself a member of the work unit family. Although he was on a training scholarship, he helped the engineer and the farmer shape outlets, construct terraces. He helped the range surveyor make ranch plans. He had a desk assigned him in the office. He had pencils and other supplies, government bulletins, and a desk full of reference books. Farmers who dropped into the office sometimes went to his desk and discussed conservation, his country, and the "peculiarities" of the farm people of the U. S. A. as compared with the farm people of Brazil.

He attended supervisors' meetings. The supervisors told him about their work. He was greatly impressed with the businesslike way in which the farmers supervised the operations of the district. He visited supervisors' farms and their families. On numerous occasions he was invited to attend farmer meetings. When he left the district, the supervisors presented him with a beautiful billfold on which was engraved his name and the name of the soil conservation district. This he treasures.

Conservation farming plans are made on the land itself by Latin Americans who are receiving training from the Soil Conservation Service. This is on the J. M. Ruhman farm a mile northeast of Kenedy, Tex., in the Karnes County Soil Conservation District. Left to right—W. J. Wooley, tenant; J. M. Ruhman, farm owner; Paulo P. P. de Melo and Jader T. de Rezende, both of Brazil.

He became acquainted with the town people—bankers, merchants, other agricultural workers, ministers, physicians, teachers. He read the newspapers—war reports and comic strips, was interested in each part as much as any North American. He went to church and to the better picture shows. He learned to enjoy our foods. He learned the better brands of clothes and accessories. He made frequent week-end trips to San Antonio to visit other South Americans. He thinks San Antonio is the best city there is.

Now he is to observe more extensively the work of the Soil Conservation Service. He has as a guide the pattern of conservation principles which were woven together while at the work unit. He is now to study experimental methods on a research station, and to observe conservation under different climatic conditions. When this is over, he will have gone a long ways toward attaining the ability to assist farmers in carrying on a complete and coordinated program of soil and water conservation.

While this article deals with one of the trainees, it is typical of the trainees generally—the student guests who are preparing for leadership in the great campaign to safeguard and make fully productive the agricultural soils of the Western Hemisphere.

SLOPE LENGTH INTRODUCED AS "FOURTH DIMENSION" IN FARM PLANNING

BY HARRY H. GARDNER

C. L. (SID) PARISH and John S. Glass, zone technicians of the Soil Conservation Service, have developed a new factor—a "fourth dimension"—which enables farm planners to eliminate much of the guesswork in determining the effectiveness of contouring, strip cropping or terracing on a particular field under any one of a number of rotations.

EDITOR'S NOTE.—The author is Chief, Agronomy Division, Soil Conservation Service, Milwaukee, Wis.

The "fourth dimension" is length of slope. Under the Parish-Glass formula for determining the correct rotation and the right conservation practice, length of slope is taken into consideration along with soil type, amount of topsoil lost and percentage of slope.

In eastern Iowa and Illinois, where the two men have introduced the new system, farm planners have prepared tables and charts showing what rotation and what particular practice or combination of practices are needed to control erosion effectively.

In the past recommendations for rotations have been based mostly on soil type, degree of slope or use capability of the land with or without conservation practices. Length of slope has been largely ignored. Such recommendations have value as a guide to over-all farm planning, but are of little use when applied to an individual farm or to a particular field. Consequently, farm planners set up their own individual guides which varied widely because they were limited largely to personal observations and experience.

Parish and Glass turned to the work of the soil conservation experiment stations at La Crosse, Wis., and Bethany, Mo., for a clue to a method of eliminating some of the guesswork. The stations had determined soil and water losses for crops and for rotations under a few specific soil and slope conditions. From these data the stations had prepared graphs showing maximum length and degree of slope combinations for a rotation with different conservation practices.

The rotations, soil types and physical conditions that the stations had worked with were few, compared with the number a farm planner encounters on every farm.

Using the graphs prepared by Orville E. Hays at the La Crosse station and Dwight D. Smith at Bethany, Mo., the zone team developed a method of extending and applying the experimental findings. They used the same reasoning and some of the same formulas that are used in applying experimental plot data to field use. So far the method has been applied to approximately 100 individual soil types and 27 different rotations.

With the assistance of conservation surveyors and farm planners, erosion rating factors were developed for various soil types. These factors make possible the application of the experimental results to the various physical conditions and rotations.

Conservation surveyors who helped set the erosion rating factors included Harold E. Grogger and Russell C. Kronenberger of Iowa, and Eugene M. Steeley, Donald W. Hopkins, Charles E. Downey, and Raymond R. Irwin of Illinois.

District personnel who also assisted and who were among the first to develop the method for field operation included George E. Summers, Gerald M. Schroeder and Oris H. Randolph of Iowa; Sterling E. Myers, Arlee C. Hanson, Jewel E. Thacker, Hampton H. Long, Arthur F. Moratz, David O. Carter, Richard L. Conlin, Frank J. Biba, Joseph B. Davidson, and Harry E. Gearhart of Illinois.

Here's how the procedure aids the farm planner: He has a field of Clinton silt loam, with a 4-percent slope and a length of 600 feet. He wants to use a corn-small grain-meadow-meadow rotation and would like to know what mechanical practices are necessary to reduce soil losses to a reasonable minimum.

So he consults his chart on that soil type and finds that Clinton silt loam has an erosion factor rating of 0.85 compared with Fayette silt loam.

With the basic length of slope table the planner finds that contour operations with the rotation he desires to use on Fayette silt loam would be effective for a slope length of 330 feet.

But under the same conditions Clinton is a more erodible soil than Fayette, as reflected by the factor 0.85. Applying the factor (330 x 0.85) he gets 280 feet, indicating it would be necessary for the farmer to apply additional protection on the 600-foot slope. In this instance, the planner again consulting his tables, finds strip cropping is needed to handle the situation.

Some farm planners have gone a step further than the preparation of tables. They have plotted the information in graph form, making it readily usable with few mathematical calculations. In determining various rotations and practices required, the answers are read directly from the composite graphs.

REPORT ON BOND PURCHASES

H. H. Bennett has commended the employees of the Southeastern Regional Nursery Division for having achieved the highest record in purchases of War Savings Bonds through the pay roll savings plan for July.

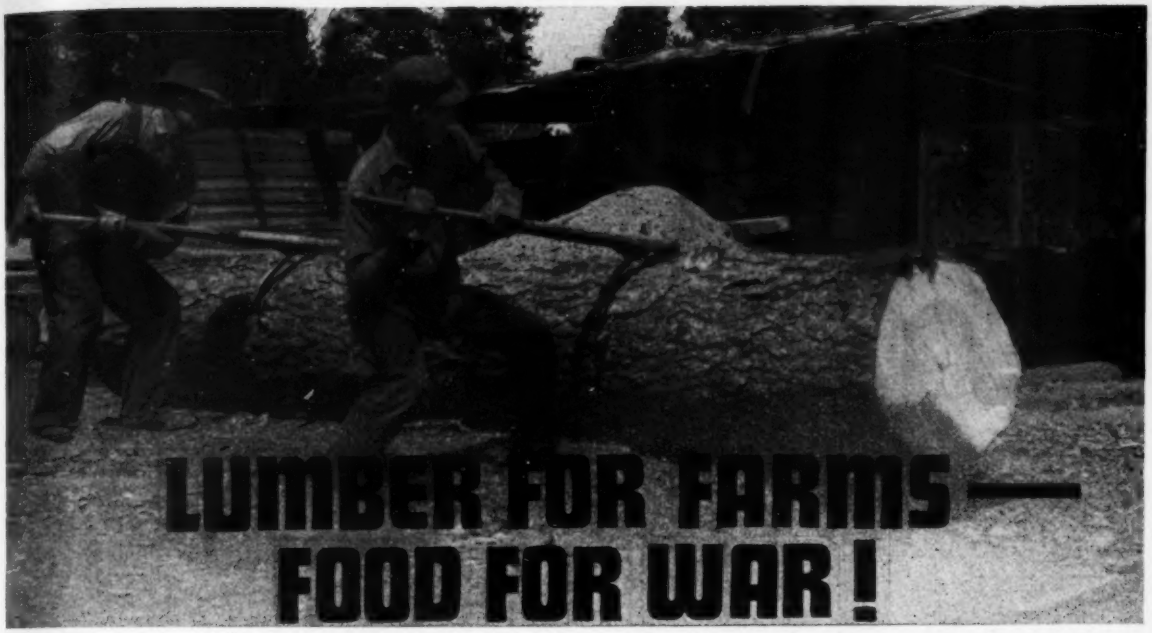
In his letter the Chief said, "The objective of our military leaders and our armed forces is the unconditional surrender of the enemy. That is also the objective of every one of us working at home. To do our full part in achieving it, we must now improve on our present pay-roll allotments. We must make every necessary sacrifice to increase our allotments and we must continue to purchase War Savings Bonds right up to the day of final and complete victory. This is an essential part of the winning of the war. Relaxation in our participation in the pay roll savings plan, due to overconfidence or to complacency, may postpone victory and cost us the lives of thousands of our boys.

"I extend to each of you the highest praise and warmest congratulations on your outstanding contribution to the war effort to date. I anticipate an even greater contribution in the future—because I know I can count on each of you and because the need is so great."

During July the employees of the Federal Crop Insurance Corporation led all other bureaus and agencies of the Department in the War Savings Bond campaign by allotting 13 percent of the total pay roll for bond purchases. Soil Conservation Service was second with 11.4 percent allotted.

—John S. Fickling.

Bicolor lespedeza is not only a field border plant easily established by direct seeding—its seeds are eaten more by bobwhite than any other and its flowers are proving the source of a light, mild honey.



LUMBER FOR FARMS— FOOD FOR WAR!

BY D. HARPER SIMMS

THERE'S A SOIL conservation district up there in northeastern Utah that takes in Uintah, most of Duchesne, and part of Wasatch counties. It's the largest district of its kind in the United States—something more than 5 million acres in all. It was organized back in 1940 when the farmers and ranchers of those counties got together and voted to establish a soil conservation district as a means of tackling their soil problems. They called it the Uintah Basin District, and it takes in everything from high, well-watered mountain country down to arid range lands, with all the degrees of climate, soil and crops in between.

One of their big projects was improvement of their irrigation systems. Around 200,000 acres in the district are under irrigation, and it was on those lands they knew they could most quickly get increases of vital war crops.

One of the great needs was for better turn-out structures—the boxes and gates through which irrigation water is released from ditch to field. Good turn-outs need to be made of lumber or concrete and so designed and installed that they will prevent erosion and increase production by controlling the flow of water, and will not be undercut or washed out.

Both lumber and concrete, under war conditions, were hard to get. Lumber was preferred, because it was cheaper and because the structures could be moved in case of need.

Above.—Darrell Johnson, sawmill operator, left, and Bob Lundell, Vernal high-school student, roll a log over to the sawmill. Several high-school boys worked at the mill during their summer vacation.

Early in November last year, the district board of supervisors met to discuss this conservation and irrigation improvement project. At least 200 new turn-out structures were needed—probably more—ranging from small to large. Someone advanced the idea of prefabricating these boxes, so that the district might avail itself of whatever labor might show up during slack winter months. The boxes would then be sold to farmers. That seemed like a good idea, so the supervisors asked the district conservationist to draw up some designs.

Where get the lumber? Checking into the matter, the supervisors found that all the local mills in the forests of the Uintah mountains had closed for want of labor and machinery or were tied up in production of lumber for war-plant construction. No timber was being sawed for agricultural use, nor could any be obtained.

Never had the need for lumber been greater on the farms of the vast Uintah Basin. Farmers had been called on for greatly increased poultry and livestock production—and that meant new chicken houses, pigsties, shearing pens, barns, and corrals.

Someone had a bright idea. Why should not the farmers themselves saw their lumber as a soil conservation district enterprise? The irrigation struc-

EDITOR'S NOTE.—The author is Chief, Division of Information, Soil Conservation Service, Albuquerque, N. Mex.

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tures were part of their conservation program, and everybody was aiming at increased production.

Nearby Uintah Indian Reservation had done the same thing. It had established a small mill and was cutting lumber for Indian needs. So the soil conservation district supervisors talked it over with the Forest Service, the Soil Conservation Service, the Agricultural Adjustment Agency, the county agent, a local banker, and others who might give help and advice.

The Forest Service agreed to select trees and sell the district the timber needed. Since it was for farm use, the price was put at $1 per thousand, in contrast to the usual $2.50. AAA said payments would be made for installing the irrigation structures if they met AAA specifications. SCS said the district conservationist who had helped plan the irrigation improvements would help plan the project and supervise construction of the irrigation boxes.

The project started. Ten thousand feet of pine were purchased at the outset, and four experienced men were hired from the district to do the logging. Mid-winter snowstorms caught the logging crews, who had to ski out on occasion on 3 to 15 feet of snow. Darrell Johnston, veteran sawmill operator, contracted to saw the lumber which was being logged.

As news about the project spread through the district, orders began to flood in. Two orders, for example, for 15,000 feet, came from turkey growers who were badly in need of poultry sheds. The supervisors soon saw that their original estimate of 10,000 feet would fall far short of demand. Another 50,000 feet and later another 113,000 feet were contracted, until a total of 173,000 board feet were included in the purchase.

Roads into the high mountain country where the lumber would be sawed proved to be the next problem. Ordinarily the State Road Commission does not open the highway from Vernal to Green Lakes until mid-May or June. The district tried in vain to open the snow-blocked roads. Finally, an appeal went to the State Road Commission and equipment was sent to the rescue on the first of April. By April 8 the road was opened and the mill moved in. On April 12 Darrell Johnston sawed through the first log. On April 16 the first truckloads of lumber splashed and skidded down muddy mountain roads to Vernal, where the prefabricated irrigation structures were to be built.

Sight of the first truckload of lumber on the streets of Vernal caused a great stir, and more and more requests for farm lumber, as well as for irrigation structures, poured into the district office.

Labor to operate the mill proved a problem, but local people were found to get the job done. First, Indians were used. Later, when they became available, high-school boys from Vernal moved into the sawmill camp and helped wrestle logs and lumber.

By April 20—just four days after the first truck load of lumber had come down the mountain—the irrigation boxes were started in the storage lot of an abandoned CCC camp at Vernal. Carpenters hired by the district, following designs which met AAA specifications, began turning out checks, drops, double turn-outs, weirs, and other badly needed pieces of irrigation equipment.

These structures are today being sold by the district to farmers who in turn can defray about 65 percent of their cost through AAA payments. The district, in turn, will realize a small profit which will go into its equipment fund or into funds which will finance further lumbering operations. Farmers install the structures in accordance with their respective farm conservation plans prepared with the help of the Soil Conservation Service. These include land leveling, nonerodible ditch grades, and other soil conservation and production practices.

The first structure was installed on a farm belonging to J. V. McLea at Roosevelt. A large double turn-out built of this district-produced lumber and treated with creosote to prolong its life, cost McLea about $170. But with its help, he can now, for the first time, make use of waste water which will increase his crop and pasture land by at least 50 acres in 1944, utilizing water which has previously gone to waste and which, if it could be purchased at local water-rights rates, would cost $2,400 plus about $3.60 per year for maintenance and debt retirement assessments.

This is waste water, of course, and as a matter of fact, additional water rights are not for sale in the community. But had McLea had the opportunity to purchase this amount of water (about 1,200 acre-feet annually) he would have paid nearly $10,000 over a period of 20 years.

With the 1,200 acre-feet of waste water, the structure gives McLea enough water that he could, if he wished, surrender his present water right, worth $2,400 in cash.

More important is the fact that previous idle land can now go into production of crops needed to win the war.

The spirit of cooperation evidenced by Uintah Basin communities when they voted in the soil conservation district, was borne out in the lumber project. The assistance of state and federal governments has been mentioned. The matter of financing

This double turnout is in operation on the J. V. McLea farm near Roosevelt.

was no small problem, for the district's treasury balance was but $300 when the project began. A local banker, who believed in the idea, advanced more than $2,000. Lumber sales soon brought in a steady revenue which not only has continued to finance the sawmill operation, but which by now has just about retired the district's note at the bank.

The district supervisors—Leon P. Christensen, chairman, Vernal; Chester H. Hartman, secretary, Mount Emmons; Davis Morrill, Tridell; John H. Cook, Roosevelt; and Lin Ross, Arcadia—are due an immense amount of credit. Harry K. Woodward, district conservationist, and other members of the cooperating agencies, worked without stint to make the project come through successfully with gains for food production, for soil conservation, and for better farming now and in years to come.

Some of the prefabricated boxes ready to be installed on Utah farms.

Darrell Johnson is rapidly converting logs into lumber to be used by Uintah Basin farmers. Standing with back to camera is Otis Weeks, Vernal high school lad.

REPORT ON DISTRICTS

As of August 15, 1943, 919 soil conservation districts, covering approximately 533,048,000 acres, had been established in 42 states which have enacted a soil conservation districts law. These districts include approximately 1,854,023 operating units and 2,415,202 farms In addition to these 42 states, a soil conservation districts law has been enacted in Delaware, Rhode Island, and Missouri.

The Department of Agriculture has entered into memoranda of understanding with 841 districts covering approximately 489,426,000 acres.

A BROADWAY VIEW OF SOIL CONSERVATION

BY EMIL CORWIN

Most of my adult life has been spent not more than three subway stops from Times Square, a region of doubtful agricultural importance. This fact is not the best recommendation for a by-line article in *Soil Conservation* magazine, but now that I am in soil conservation work myself, it might be of interest to some to know the conservation views of a New Yorker from the perspective of Broadway and 112th.

Where I come from soil is something to be seen at an excavation. Food is what you pick up at the grocer's two doors down or at the fruit stand across the street. Where or how it is grown, or how it got to upper Broadway, nobody gives a hoot. When it comes to food, New Yorkers are in the take-it-for-granted school.

So I must confess that when I came to Washington, soil conservation seemed an impersonal thing, like World Peace; big and important and necessary, but impersonal nevertheless. I have a theory as to why it seemed that way to me. When I was an agricultural college student the conservation movement was about where radio was in the crystal-set stage, though I did feel that soil conservation, like radio, was here to stay. The dust storms were yet to come, the Soil Conservation Service was almost a decade away, and erosion was a word expensive dentists use to describe simple cavities. That is approximately where I left soil conservation when I moved to the big city. All the time I was there soil conservation was growing up. I wasn't to realize how vast and important the movement had grown until I shook the mazda from my eyes and came to Washington. And if that doesn't explain why soil conservation seemed impersonal to me at first, don't hold it against the Massachusetts Agricultural College. It didn't take me long to catch on when I got here, however.

By the time I had learned that the Froid demonstration project had nothing to do with psychoanalysis and that it is not proper to say "Gesundheit" after lespedeza and kudzu, soil conservation had become a very personal thing to me. I needed no long indoctrination to realize that in soil conservation rested my own destiny and that of my country's.

Erosion was to me what a bogeyman with horns is to a neurotic child. I never imagined that more than 200 million acres of once-productive cropland in the United States were already ruined or seriously damaged, and that an additional half million acres of land are being ruined by wind and water erosion every year. Nor did I realize that one inch of vital topsoil, that it takes Nature hundreds of years to make, can be swept off by wind or water in just a few days. Are we going to lose our No. 1 resource? Are we going to starve? I got no comfort from the experts.

North America is drying out, said Paul Sears.

If topsoil is entirely washed or blown away, living standards are lowered, Russell Lord wrote.

We are threatened with national extinction, G. V. Jacks warned.

The American continent could turn into the Sahara of the Western Hemisphere at the present rate of soil and water depletion, Raymond Gram Swing reported.

Critical food shortages within 50 years are possible unless nations push ahead on soil-conservation programs, Dr. Hugh H. Bennett predicted.

Empires have perished by soil depletion as well as by the sword, again Dr. Bennett said.

Land under the plow is wasting away by erosion faster than soil is being formed, cautioned W. C. Lowdermilk.

We have ruined more land in the last 50 years than Japan uses to support her population of 60 million, according to J. Russell Smith.

Well, you can't hear talk like that and not be aroused, no matter who you are or what part of America you come from. This is your land. You can do something to save it. It is not enough to defend our shores from enemy invaders. We have got to defend the whole land from the enemy in our midst, the arch saboteur of all time—Erosion.

Before you realize it, you are talking conservation to all comers—in the office, at home, and in public places. You don't talk about it casually, as you do the baseball scores. Your voice rises higher and higher, treble and agitato, as though your wife or your city friends or whoever you are addressing is responsible for the destruction of our good croplands.

With me, the emotional gamut ran from F to A—from Fear over the dangers of erosion to our way of life to Admiration for the way conservationists in their speech and writings have humanized the problems of soil conservation. Whatever thoughts you may have had about dull reports coming out of Washington agencies were soon to be dispelled on reading and listening to the language of the conservationists.

To soil conservationists this productive soil we are asked to preserve, maintain, and build up for our prosperity and security is not an inanimate matter, but a living, vital thing. Handle it with care, as you would your own body. Give it rest, nourishment, protection, variety. Soil is like the human body. When topsoil goes, the land is *skinned*, *wounded*, or *scarred*. The land can *bleed* to death and it can be *healed*. Gullies are the earth's *cancer*. Erosion is a contagious *disease*. Stubble mulch is *bearded* soil. Soil and water, the earth's *placenta*. This is the way the conservationists talk. The soil becomes real and, alive, and whether you were born to it or not, you acquire a love and affection for it that is not easy to explain to the boys back in Radio City.

I was impressed by the facility of conservationists to strike phrases to kindle the imagination, to bring home to Americans the importance of soil conservation to their existence and happiness. These lines come to mind:

"Contouring is a discovery as great as the discovery of the wheel and fire. It has to do with human destiny."

"Every farmer has got to take care of four city families."

"The principle of conservation ranks along with education in general and religion in general as one of the great forces through which we can reconcile liberty with unity."

This is dynamic talk, straight from the shoulder, and it makes me feel pretty good to know that I am a part of the movement. I remember my satisfaction in reading that conservation farming not only protects and improves the soil but increases crop yields per acre by 20 percent and more, and with little or no additional labor, machinery, and fertilizer. Here, I thought, is a natural for a Believe-It-or-Not.

Soil conservation is the answer to increased food production. It has a vitally important role to play in winning the war for the United Nations and in building a post-war world of a greater abundance and opportunity.

I'm going to pass the word around Broadway.

BETTER IRRIGATION—KEY TO BETTER CROPS IN THE SOUTHWEST

BY J. G. BAMESBERGER

IT WAS JUST A YEAR ago, in September 1942, when the "once in a hundred years" rain struck northeastern New Mexico. When the storm had passed, every irrigation system in the vicinity of Springer was out of operation. Nine storage dams were breached. Two diversion dams were gone. Four main canals were broken in numerous places. Unless the damage were repaired before the next irrigation season, approximately 22,000 acres of irrigated land would be out of cultivation.

Farmers realized that they could repair only a portion of this damage through their own efforts. Immediately, therefore, they requested aid from the Eastern Colfax Soil Conservation District. The district, in turn, asked the Soil Conservation Service to provide all assistance available.

Technical services and some heavy equipment were provided, with the result that seven storage dams were repaired to the satisfaction of the State engineer, one diversion dam was rebuilt, and three main canals were repaired. All but 1,100 of the 22,000 irrigated acres were back in full production this year.

This is typical of the group irrigation work undertaken in Region 6. Storms, deterioration, and lack of maintenance all take their toll of irrigation structures; there are always some very good farm lands threatened with retirement because of lack of water.

Modern irrigation agriculture in this country started almost 90 years ago with the settlement of Utah, and spread rapidly to surrounding states. Structural works undertaken in those early days necessarily were built solely from readily available materials, and, judged by present standards, were of a makeshift or inferior quality. Except in the more favored localities, repairs and replacements continued to be of the same poor quality, because of financial exigencies, and so we find the agriculture of large areas in the Southwest dependent for existence on unreliable, inefficient works which frequently fail at the time they are needed most.

A reliable water supply is the key to production out here. In most parts of Region 6 no irrigation water means no farming. Failure during the irrigating season means reduced yields or even no crops at all. It is no wonder that water supply is the problem uppermost in the minds of the farmers.

EDITOR'S NOTE.—The author is Chief, Division of Engineering, Soil Conservation Service, Albuquerque, N. Mex.

There are now approximately 1,048,000 acres of irrigated lands in soil-conservation districts in Region 6. Requests from soil-conservation districts have resulted in the Service personnel of this Region providing, during the 1943 fiscal year, the necessary technical assistance for the repair or construction of 26 storage dams, diversion dams, or canal headworks, and repairs or improvements on 27 main canals.

In no instance were such services granted unless it could be shown that the completion of the works would provide a substantial increase in essential food production. Such increase was obtained through assuring a full crop in areas where partial yields had prevailed, by increasing the acreage under irrigation, or by restoring water to previously irrigated land that otherwise would not be farmed. Ninety-seven thousand acres were benefited by the works completed in time to be utilized during the 1943 irrigating season.

An estimate of the increased production expected was made for each project by experienced technicians. Total increases in crop production from these group irrigation jobs amounted to the total yields from 42,500 acres of irrigated land. This is an increase of a little more than 1 percent in the food production for 1943 from all the irrigated cropland in the States of Arizona, Colorado, New Mexico, and Utah. These figures do not take into consideration the improved irrigation and management practices adopted on the farms benefited—items which in themselves effect a decided increase in crop yields.

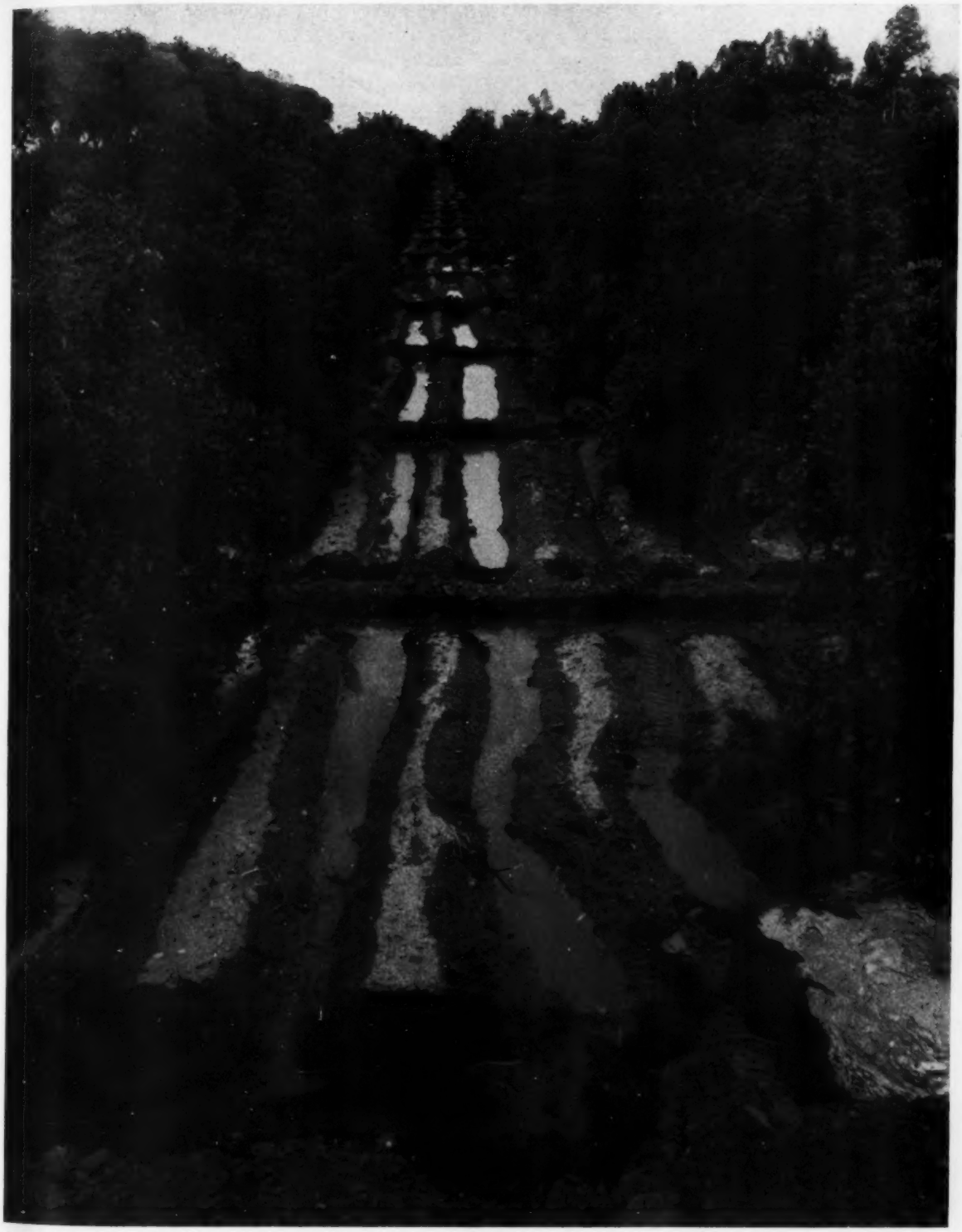
Notwithstanding the accent on group jobs completed the past fiscal year, Region 6 feels that its greatest contribution to the permanence of irrigated agriculture is in improvements made on individual farms. Installation of improved distribution systems and irrigation practices on individual farms has been keeping pace with the group jobs. Improved irrigation systems, better water management, and land leveling were accomplished on 90,000 acres during the past fiscal year. The estimated increased crop production is equal to the yields from approximately 20,000 acres of irrigated farm land.

The program for improving the use of irrigation water on the farm is based on three requisites:

(1) Know where the water is going.

(2) Keep the water under control at all times.

(3) Have a well-planned lay-out which fits the farm.



The block-furrow method of irrigation accomplishes an even distribution of water. This Arizona farmer is getting maximum use out of every drop.

Neither the farmer nor anyone else can determine whether good irrigation prevails until he knows just where the water is going, how deep it is percolating into the soil in all parts of the field, and how deep the water should penetrate in order to secure adequate irrigation, and how much is running off the lower end of his field as waste. To acquire this information, farmers are urged to make use of soil augers, moisture probes and shovels, and to time the rate of advance of the water throughout the entire length of the run. The need for changes in irrigation lay-outs, including lengths of runs, grades, methods of irrigating, changes in size of irrigating streams, and need for leveling, will all be indicated by such information.

The case of Guy Hafen in southern Utah is typical. Decreasing yields were puzzling this farmer until a moisture probe in the hands of a Soil Conservation Service technician revealed that he had been over-irrigating. "I didn't think it was possible to over-irrigate in this dry country," Hafen said. He is convinced that he has found his trouble, and plans from now on to check moisture penetration with a probe.

Unless water is kept under such control that a farmer can make accurate adjustments in his irrigating stream, it is impossible to apply the right amount of water uniformly across the entire field. Control structures, such as drops, checks, turnouts, spiles, etc., all have their place, and their proper use is encouraged by every available means.

One district, at Grand Junction, Colo. has gone into the business of manufacturing concrete turnouts, checks, and spiles and selling them to farmers at cost. The plant is unable to keep up with the orders. At St. George, Utah, a district owns a number of sets of forms for concrete turnouts and lends them to the farmers without cost. At Roosevelt, Utah, the Uintah Basin District has taken over the operation of a sawmill. Logs cut on the national forest are sawed into lumber and used in the manufacture of wooden division boxes, checks, and turnouts, which are sold to farmers without profit. Wherever improved irrigation structures are being used, farmers are growing better crops with less labor and at lower cost.

When need for a better irrigation layout or for improved leveling becomes apparent, the farmer is encouraged to make the improvements as opportunity and finances permit. If leveling is needed, he is advised to "rough level" whatever area he can afford, but at the same time to "finish level" a small portion of each field, which will serve as a pattern toward which he should work for the rest of the field.

Improved layouts require skilled technical assistance, but a point worthy of note is that proper lengths of runs and grades are determined by trial irrigations rather than by any rule. There is widespread interest in improved layouts, particularly in shortened runs and better land leveling. Lloyd Taylor, a Red Mesa, Colo., farmer, requested such assistance. The runs on his fields were shortened and waste water was eliminated. As a result, Taylor had sufficient water to grow a full crop on 301 acres, as contrasted to the 150 acres he had been able to irrigate before.

Land leveling has been paying big dividends to farmers in all parts of the region. In the Mesilla Valley, N. Mex., a 6-acre field on the E. J. Sterns farm required 13 hours to irrigate before leveling; it now takes one hour, and is producing fine alfalfa, whereas before the crops were hardly worth harvesting. In the same area, W. H. Brookerson saved enough labor and water charges the first year to pay for his leveling costs. Another Mesilla Valley farmer increased his cotton yields from one to two bales the first year after leveling.

At Safford, Ariz., M. J. Ferguson bench terraced his farm and installed concrete control structures. As a result, he was able to irrigate with one-third less water, to increase his production by about one-third, and to cut his irrigation labor in half. A farmer near Morgan, Utah, states that leveling has increased the value of one of his fields $50 an acre. In the San Luis Valley of southern Colorado, where approximately 1,200 acres have been leveled by district machinery, a 106-acre field that formerly required 5½ days to irrigate can now be irrigated in 20 hours. Although, 14,000 acres of irrigated land have been leveled in the Region during the past year.

The farmer's cropping practices, tillage practices, management program, and erosion problems all have a controlling influence on the farm irrigation lay-out and irrigation practices. For example, where a farmer is employing a grain-alfalfa-potato rotation, selection of the irrigation grades will be governed by the grades required to irrigate the potatoes with furrows and not the grades required for alfalfa and grain with border irrigation. This will require certain adjustments in practices for the border irrigation. Consideration must be given to the farmer's tillage equipment when breaking up a field with cross ditches to shorten the runs. If he is using heavy tractors, the runs cannot be made so short that they will seriously interfere with the use of such equipment. In the location of ditches, grades should be selected that will prevent erosion, or if

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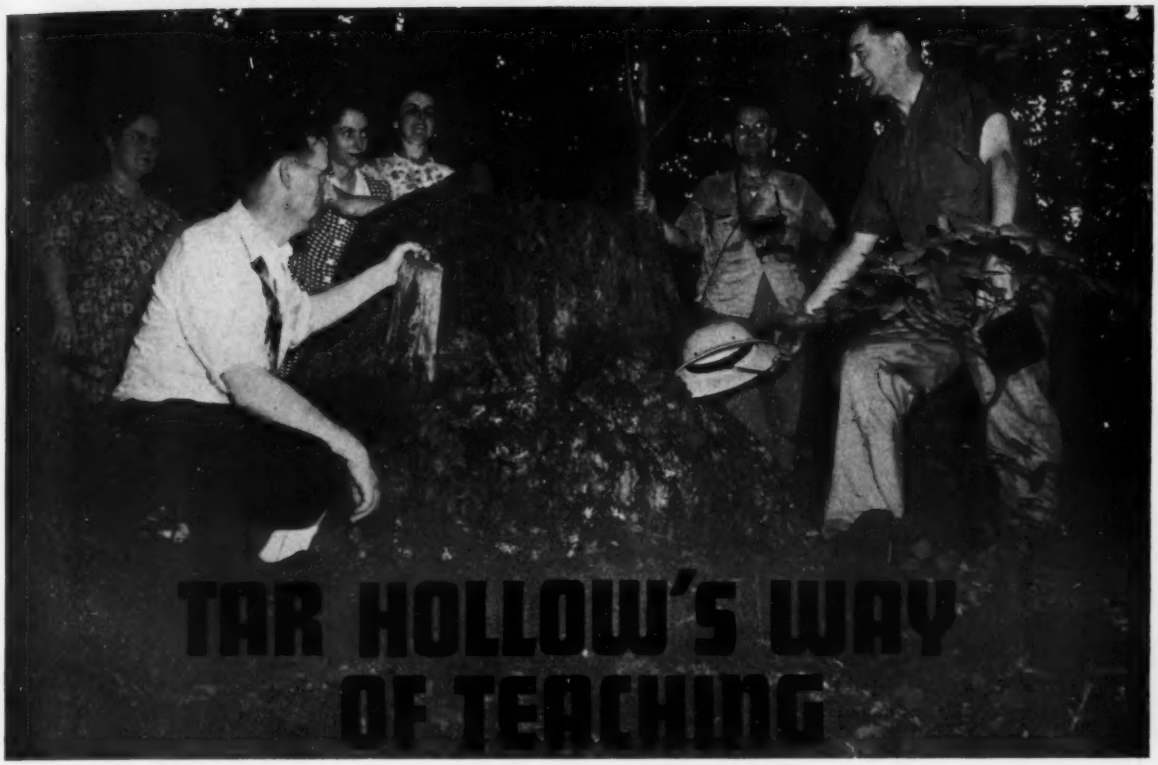


TAR HOLLOW'S WAY OF TEACHING

BY WELLINGTON BRINK

Above—Students of the conservation laboratory study the effect of sheet erosion in the once cut-over Ross-Hocking Forest. According to W. H. Barnes, at right, member of the laboratory's teaching staff, more than 18 inches of soil has been removed by erosion. The tree, only the stump of which remains, must have been more than 1,000 years old.

MANY a mickle makes a muckle. And many a little towhead of today will make the great democracy of tomorrow. How important, then, in all our post-war planning, in all our expansive talk of future security, of National and international programs—how important that we give consideration to the towhead and the towhead's teacher and the whole educational approach!

Even now, school windows are beginning to open, revealing the world that is ours. Every time that happens, concepts freshen, panoramas lengthen, perspectives deepen, viewpoints sharpen. Science leaps out of textbooks and test tubes, and finds vitality and meaning in the promise of the land.

Teaching techniques undreamed of a short decade ago are now being put to fair test. Some of these techniques already are pioneering paths to more happy relations between Man and his environment.

One of the most exciting of recent educational adventures is that which has its setting in Tar Hollow. For several summers the State of Ohio has been offering to teachers what is perhaps this country's most unique training in the natural sciences. It is unique because it recognizes ecological fundamentals. It is unique because it whets to fine edge the student's capacity to observe, to correlate, and to arrive at deductions. It is unique because it challenges pupil rather than merely pedagog.

Tar Hollow, physically speaking, is a well-designed camp in the Ross-Hocking State Forest, eighteen miles from Chillicothe. It nestles in a rugged, wooded valley. The great lodge, flanked at either end by massive stone fireplaces, is the center of activities. Here classes assemble, meals are served, office records are kept, motion pictures find a screen. Here, too, are a library and a museum. Log cabins housing faculty and students perch on nearby hillsides. A five-acre lake bathes the foot of a long slope.

Tar Hollow labels itself a "conservation laboratory"—and it lives up to its label. Ollie E. Fink, laboratory director, fathered the idea. It was such a good idea that it immediately received the joint blessing and sponsorship of the State Department of Education, the Ohio Division of Conservation and

Natural Resources, and the Ohio State University. The laboratory carries an ample, topnotch staff of specialists in plant ecology, geology, animal ecology, nature study, and education. There are no textbooks, in the usual sense—the land itself is the textbook.

An annual feature of the six weeks' summer course is a conference on conservation, nutrition, and human health. This conference brings to a comparatively isolated spot many of the most brilliant minds of Canada and the United States. Novelists, editors, doctors, nurses, dieticians, farmers, get into shirt-sleeve discussions to the infinite delight and profit of the young men and women who in other seasons labor as teachers in grade schools, high schools, and colleges.

From New Hampshire came the conferees this year, and from Tennessee; from Michigan and California; from Washington and New York and Indiana. They came from Mississippi, too, and from Connecticut and New Jersey—came to talk of soil and water, of dust and mud, of food and malnutrition. They came to put the wasting world under a microscope. They came to search out measures that will help put a period to the conflict between Man and Nature.

This, said a metropolitan daily, was of National—yes, international—significance, comparing in grandeur of concept with the great food conference at Hot Springs, Va.

This, said Louis Bromfield of best seller fame, was the forerunner of "a long-range program involving every person in the United States . . . indicative of a revolution in psychological viewpoint, of a shift in educational emphasis . . . coming at a time when we are on the edge of feeling the great pinch, at a time when our standards of living are bound to go down and down and down, unless we take care of our land."

Hugh Hammond Bennett, chief of the Soil Conservation Service, supplied the hard mathematics. There are 4 billion acres of arable land, said he, that must be made to provide a sure and satisfactory living for the 2 billion people of the globe—and for the generations to follow.

"We must practice soil conservation and teach it to our children," he declared.

Dr. Bennett was not in too happy a frame of mind, having arrived fresh from an inspection of the flood-gutted Middle West, where a billion tons of soil had been torn from the land and where farmers had been robbed of $700,000,000 worth of capital assets by erosion.

But the Chief of the Service went on to hail the completion of soil-conservation measures on 50,000,000 acres, and, by a slide-illustrated lecture, to chart the job that must be done throughout the United States to make our agricultural land safe, efficient, and productive. By "fitting conservation measures to the land," soil conservation is revolutionizing crop production with an average increase of at least 20 percent, making an immediate and vital contribution to the winning of the war.

Other speakers included Director Fink, who discussed the "water pyramid;" W. D. Ellison, supervisor of the Northwest Appalachian Soil and Water Conservation Experiment Station who told of the importance of trapping raindrops in the fields upstream; Dr. William F. Petersen, author of the four-volume "The Patient and the Weather," who drew relationships between weather records and human behavior.

(Continued on page 92)

WHO'S WHO IN PICTURES ON OPPOSITE PAGE

1. H. H. Bennett, Chief of Soil Conservation Service; Don Waters, commissioner of Ohio's Division of Conservation and Natural Resources; Hon. John W. Bricker, Governor of Ohio.

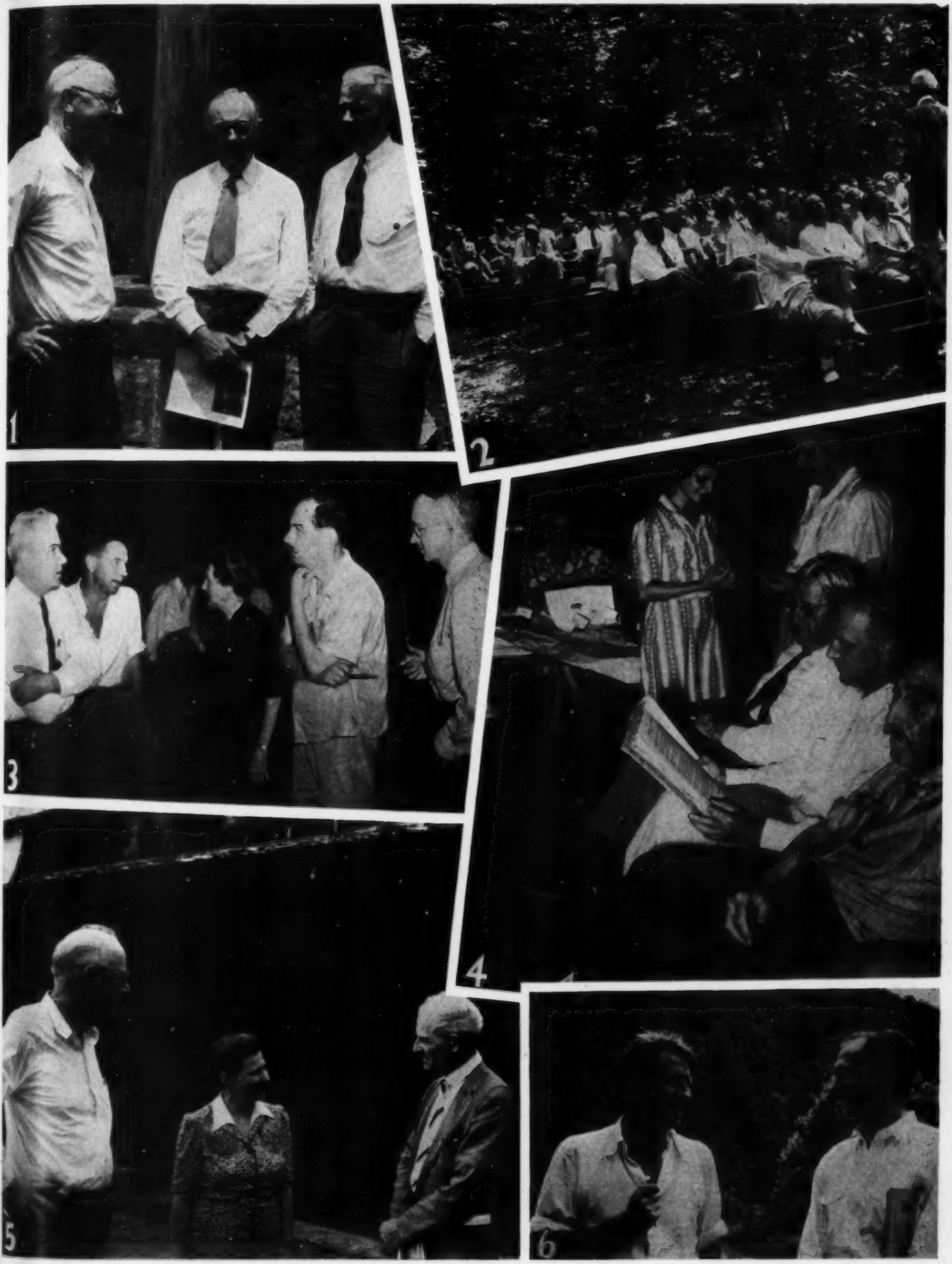
2. John D. Detwiler, Professor of Applied Biology, University of Western Ontario, addressing a group of students and distinguished guests at the second annual conference on Conservation, Nutrition and Human Health.

3. Governor Bricker, Louis Bromfield, novelist and farmer; Mrs. Lois Francke, conservation chairman, Garden Club of America; Paul Sears, author and Professor of Botany, Oberlin College; Wellington Brink, editor of *Soil Conservation*.

4. Standing—Miss Claire Rothenburg, student at the laboratory, and Dr. Jonathan Forman, editor of the *Ohio State Medical Journal* and executive secretary of Friends of the Land; sitting—Dan Wallace, War Food Administration; Russell Lord, editor of *The Land;* David C. Warner, water conservation consultant, Ohio State Department of Public Works.

5. Canada, Russia, and the United States have a common enemy in soil erosion; Dr. Bennett and Dr. Detwiler discuss the conservation task with Mrs. Rosa Dembo, Russian-born Ohioan, between sessions at the Tar Hollow conference.

6. Away from typewriters, these two writers find a moment to smile, as they plan ways to teach soil conservation to the people of the land: Louis Bromfield, known for his books, and Gordon K. Zimmerman, information chief of the Soil Conservation Service.



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Dr. William A. Albrecht, head of the soils department in the University of Missouri, reviewed plant research findings in the application of lime to soil. Dr. George M. Curtis, professor of surgical research at Ohio State University, explained the urgent need of iodine as a trace element in soils. Major Z. T. Wirtschafter, M. C., U. S. Army, author of "Minerals and Man," discussed the role of certain minerals in human nutrition—sodium, potassium, calcium, magnesium, chlorine, phosphorus and sulfur. J. L. Lush, pasture specialist of the National Fertilizer Association, delved into the relationships of minerals and other nutrients to the feed and food values of plants.

"The most vital work being done in the state today is conservation education in the schools," stated Ohio's Governor John W. Bricker. "The health of this country is entirely dependent on the soil."

Friends of the Land had a worthy representation. So, too, did the Garden Clubs of America. On the program appeared John D. Detwiler, president of the Canadian Conservation Association, and Jonathan Forman, editor of the Ohio Medical Journal.

Tar Hollow for two busy, exciting days was a crossroads of conservation thinking, a sharp focal point of conservation viewpoints. The future of the soil and of the human race was the fierce concern of all.

And yet, for all the quickened tempo of the Conference, these two days were but a part—a better publicized part—of the six weeks' course of study. The distinguished visitors constituted a "guest faculty" furthering the larger educational purpose. The "plot" investigations went right along before and after the Conference.

The "plot" program at Tar Hollow is illustrative of the teaching methods. Each plot is of two acres; a long, narrow strip hugging a hillside and including both woods and clearings. Two students are assigned to each plot. Their task is an intensive one of research and observation, of measurement and correlation. It poses half a hundred other tasks, the purpose of which is to afford a complete, detailed understanding of the geology and soils of that small segment of the earth's surface, of plant and animal life. Soil profiles are examined and sketched from top to bottom of the slope—leaf litter and humus, depth and texture and colors of topsoil and subsoil and parent soil. Samples are taken of stream and run-off waters preceding and following a rain. Channels of air and water drainage are charted. Mineral resources are noted. Past and present land uses are considered. Plants are identified and cataloged and made friends with. A census is made of bird and mammal populations. Insectivorous life is examined. Miniature nature trails are set up as for a particular school back home. Reports are made detailing similar plot projects to be arranged for other classes of students in other locales. A complete ecolcgical picture is drawn—the relationships of life to life, of natural processes to the welfare of man. The whole biota is the challenge. The science branches are bundled up together into the larger and more meaningful science and art of ecology, which controls the compatibility of Man and Nature in companionship and partnership.

All this is a forward step in education. It is a humanizing step. It is a vital and urgent step if the schools of the land are to help insure the future of the land. Tar Hollow has taken this step. School men are watching. Some are speculative, still others downright enthusiastic. Tar Hollow's venture constitutes a departure, and departures must be scrutinized closely. That is probably fortunate, because the necessity of close scrutiny has attracted to Tar Hollow a wide scattering of teachers not only from Ohio but from other states, from as far away indeed as the pavements of New York City and of Atlanta. They come, they learn, they are convinced. And they go back home to teach the little towheads—city and country lads, alike—not merely the wonders of the rock or the plant cell or the amoeba, but the wonders and the significance of the earth, of the life it supports, and of the hazards it confronts.

GIRLS IN GARDENS

The farm labor shortage is no great problem for Harold L. Hindle, vegetable grower, who owns and operates Gate Hill Gardens, South Hadley, Mass.

Mr. and Mrs. Hindle have four daughters, all of whom work on the farm and during peak seasons girl students at nearby Holyoke College are hired as supplementary help.

Mr. Hindle, incidentally, is an outstanding soil conservationist and recently was given an award by the Massachusetts Department of Agriculture for his notable accomplishments.

At Gate Hill Gardens Mr. Hindle has constructed 610 feet of diversion terrace and 660 feet of permanent outlet. He has two acres in contour strips and three acres in contour tillage.

BETTER IRRIGATION—KEY TO BETTER CROPS

(Continued from page 88)

Log and rock emergency structure built on the Hondo River in New Mexico to replace a diversion dam completely destroyed by a record flood. Several hundred acres were kept in production by this work.

that is not possible, drop structures must be provided. The farm planner has an extremely complicated and highly technical problem facing him when he starts working on an irrigated farm.

Irrigation problems frequently afford engineers an opportunity to exercise their ingenuity. At Washington Fields, Utah, investigations made in connection with a proposed drainage project revealed that heavy ditch losses occurred in main canals and laterals. A few measuring flumes were installed, and the information which was obtained proved to be of such value that the irrigation company is installing flumes on every lateral. At the same time, the directors of the irrigation company are strongly urging each farmer to make more efficient use of water in the hope that this will, to a large extent, alleviate the drainage problem.

The Bergen Ditch Company, near Denver, Colo., was permitted by the State engineer to fill its No. 2 reservoir only to half capacity because of the unsafe condition of the earth dam. By means of a system of drains and the careful placement of additional earth on the dam, the structure was repaired. The reservoir could then be filled to capacity, and the acreage of irrigated land was doubled. The water from Red Creek, near Paragonah, Utah, was divided between two companies and the resultant unequal distribution and inefficient use wasted so much of the supply that only 1,450 acres of land could be irrigated in a haphazard manner. Soil Conservation Service technicians, overcoming problems of organization, water rights, and relative values, succeeded in effecting a consolidation of the two companies. With the construction of an additional storage reservoir and more efficient use, the community can put 2,500 acres of land under good irrigation.

Concrete turnout boxes which are sold to the farmers at cost by a New Mexico soil conservation district. To irrigate efficiently, such structural control is necessary at each outlet from the ditch.

Erosion is prevented in this ditch by means of low masonry drop structures. Note the wooden turnout boxes used to control the water being delivered to the field border.

The farmers on the Black-McClesky canal near Duncan, Ariz., must rely to a large extent on flood

flows in the Gila River for their summer irrigation water. The capacity of this main canal was so limited that none of the farmers could get their entire farms irrigated during these high water stages. Enlargement of portions of the ditch, changes in grade, and enlargement of structures have doubled the capacity of the ditch and eliminated crop damage caused by recurring water shortages.

Farmer interest in irrigation improvements is ahead of Service ability to furnish the technical guidance requested. There is a large and important field of work open to the Soil Conservation Service. A sample irrigation survey indicates that 75 percent of the irrigated land is in need of improved irrigation systems or improved irrigation practices. This constitutes an obligation and a challenge which should be embraced by the Soil Conservation Service. In accepting this opportunity the Service not only will further the war effort but also help to insure the permanence of agriculture.

DASH OF RAIN ADDS INTEREST TO COLUMN

Lyle B. Leonard, work unit conservationist at Clinton, Ky., not only writes a weekly column on soil conservation activities for the Hickman County Gazette, but also furnishes the paper with rainfall and temperature data for good measure.

Before the Hickman County soil conservation district was established, the hydrological section of the Soil Conservation Service set up a rain gauge and thermometer at the Kentucky Utilities plant. The recording instruments were later transferred to the Weather Bureau and, when an observer-without-pay was needed, Leonard volunteered to take the job.

In spite of wartime shortages of labor, farmers last year found time to plant shrubs useful for erosion control and wildlife, a million and a half of which will in two or three years product fruits suitable for preserves, jams, jellies and sauces. Among them wild plums of three species and cherries played a prominent role. Especially favored was the large western sand cherry, a good soil stabilizer in sand-blow areas and a producer of a large, well-flavored fruit. Hazelnuts and filberts, blackberries and raspberries, currants, highbush cranberries, elderberries and grapes were among the other fruit-producing species much used on sites where they contributed to the holding of soil and to the prevention of excessive run-off.

REVIEWS

ARTIFICIAL MANURES. By Dr. Arthur B. Beaumont. New York City, 1943.

Dr. Arthur B. Beaumont's little book on "Artificial Manures" is a very valuable document for the city gardener or for the city man who moves to the farm—in fact for anyone trying to produce crops without any background in the fundamentals of crop production.

Dr. Beaumont, in a few pages, presents a streamlined picture concerning soils, their origin, and something of their productivity, and gives a clear view of a complex situation. He discusses organic matter, humus, and the mysteries of the carbon-nitrogen ratio in language that anyone can understand.

One of the highlights of the book is the discussion of "Fads, Fakes, and New Methods" that are constantly cropping out in agriculture and particularly so at this time when so many people working with the soil are perfect targets for the operation of fakers. Dr. Beaumont gives as an example the case of ground acidic rock which a few years ago was sold in the Northeast as a plant food under different trade names, and although the plant food in the material was worth only a few cents a ton, uninformed buyers bought it in small lots, paying at the rate of more than $100 a ton. He points out how to avoid such pitfalls.

The discussion concerning manures is excellent. The place of mineral fertilizers and organic materials is set out clearly; it is shown that either will increase production materially but when both are used, production nearly doubles. This, of course, is true where mineral deficiencies actually exist in the soil.

Details are given for the building of a compost pile which is so valuable to the city gardener. The use of cover crops is discussed thoroughly, even to the inclusion of a table giving seeding rates and dates. The place of soil conservation in maintaining and increasing production is also given attention.

One section of the book pertains to the use of artificial manures for extensive farms. There is also information of value to greenhouse operators and mushroom growers. In addition, a very excellent list of selected references is included for those who are interested in further investigating particular phases of crop production, and the appendix gives the content of plant food elements in an extensive citation of materials that can be used for the preparation of artificial manures.

This compact little book is an extremely worthwhile tool for the home gardener.

—C. R. Enlow.

The past year saw an increase of 44 percent in the number of farm ponds managed for fish production by farmers in soil conservation districts. More than 3,000 ponds have now been carefully stocked with appropriate numbers and species of fish and are being fertilized to increase yields of fish for food in various parts of the country. As a result of close cooperation between the Soil Conservation Service and the Fish and Wildlife Service, the latter bureau last year provided a million and a half young fish for 1,350 ponds.

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Compiled by ETTA G. ROGERS, Publications Unit

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[1] From Superintendent of Documents, U. S. Government Printing Office, Washington, D. C.

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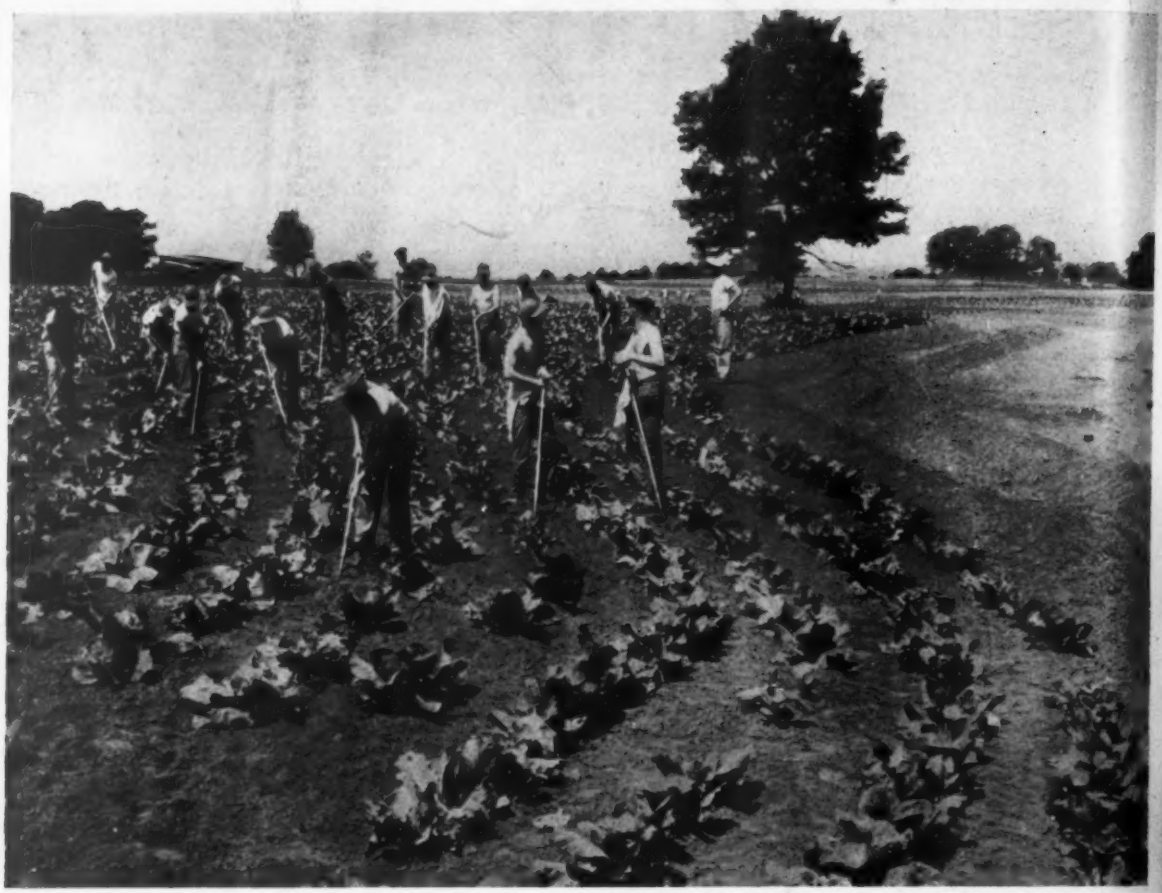

Cabbages on the contour! Cadets at the Navy Pre-Flight School, Athens, Ga., toughened themselves by working in their 42-acre Victory garden.

NAVY PRE-FLIGHT SCHOOL GARDENS ON CONTOUR

The Navy Pre-Flight school at Athens, Ga., this year "killed two birds with one stone" in its 42-acre victory garden. By working in the garden, cadets conditioned themselves for flight training and eventual combat duty, and produced enough vegetables to supply the mess halls for about 4 months. Two thousand men are fed daily in the mess halls.

Cadets who come from all parts of the United States are learning about conservation farming, as the entire garden is terraced and practically all vegetable crops are grown on the contour. This is done to hold soil washing during heavy rains to a minimum, and to conserve moisture and plant food.

The garden produce formed a substantial part of each cadet's daily 5,000 calorie diet. One hundred thousand onions were planted, half an acre of turnips, a quarter-acre of carrots and greens, 10,000 tomato plants, 6 acres of corn, 3 acres of string beans, and 3 acres black-eye peas. As the early produce was harvested, squash, okra, radishes, yams, beets, watermelon, and cantaloupe were planted.

Navy officials estimate that the cadets harvested some 80,000 ears of corn, 80,000 tomatoes, and 7,000 heads of cabbage. These, along with other vegetables coming from the contoured victory garden, supplied needed vitamins and balanced meals and at the same time eased the burden on the food supply in Athens and vicinity.

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